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THE VULNERABILITY OF THE U.S. ECONOMY TO PRODUCER CARTEL FORMATION: THE CASE OF BAUXITE

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ABSTRACT

PROBLEM STATEMENT: The successes attained by the Organization of Petroleum Exporting Countries (OPEC) in quadrupling the price of crude oil and of the Arab members of OPEC in embargoing oil exports to the U.S. in 1973 have raised fears that countries exporting other critical primary commodities might attempt to follow the OPEC example. Ten major producers of bauxite established the International Bauxite Association (IBA) in March 1974, and most of the members shortly thereafter unilaterally decreed substantial increases in taxes and royalties on their bauxite exports. Since the U.S. imports 90 percent of its bauxite requirements from IBA members, this paper examines the risk that the U.S. might be subjected to the kinds of collusive actions carried out by OPEC members with respect to petroleum. The study presents an analysis of contemporary theory concerning cartel formulation and applies the inherent criteria to the bauxite case. Also described are world-wide patterns of production and consumption as well as prospects for new technology in aluminum production, all of which affect U.S. dependency and ultimate vulnerability to restrictive actions.

CONCLUSIONS: Although the U.S. is, and will continue to be, heavily dependent on imports of bauxite to fulfill its growing demand for aluminum, the IBA does not possess the unanimity of purpose and the tight control over supply required for restrictive measures to be significantly effective.

In extreme circumstances, the U.S. possesses vaste quantities of non-bauxite, aluminous ores from which aluminum could be obtained using existing technology, although at substantially higher cost. But with greater investment of capital resources and time, these sources are realistically available substitutes for imported bauxite.

Nevertheless, the growing cohesiveness and assertiveness of the Third World coupled with the erosion of the U.S. power to determine unilaterally the outcome of events on the international scene, suggest that much higher priority should be given to working out new, cooperative relationships with the Third World that would help to ensure U.S. access to essential supplies of raw materials. In return, guarantees of access to U.S. markets for the processed and semi-processed goods of developing countries should be afforded to preserve the strength of the U.S. economy and avoid potentially serious dislocations and negative impacts on the strategic position of the nation.

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CHAPTER I

INTRODUCTION

The embargo of oil exports to the United States by Arab members of the Organization of Petroleum Exporting Countries (OPEC) declared in October 1973 and the subsequent four-fold increase in crude oil prices had, in addition to their direct impact on the U.S. economy, the effect of arousing concern over this country's ability to obtain other essential raw materials at reasonable prices. Indeed, for a highly developed and integrated industrial superpower such as the U.S., adequate supplies of manufactured goods are of critical importance, and an inability to ensure the continuing availability of such supplies has grave implications, not only for the functioning of our economy, but also for national security policy and strategies adopted in pursuit of national goals. Guarded statements by former President Nixon and Secretary of State Kissinger in late 1973 that the U.S. might be obliged to consider military action if the U.S. economy were faced with "actual strangulation" as a result of actions by the Arab states are poignant reminders of the importance access to critical commodities can assume. Although concern that the U.S. and, for that matter, the world might be running out of certain critical and non-renewable raw materials is not a new phenomenon--the Paley Commission Report forecast over a

quarter century ago a growing shortage of petroleum in the U.S.--the 1973-1974 oil embargo imparted a new urgency to consideration of the subject.

Following a four-day meeting in Conakry, Guinea, Ministers of seven bauxite-producing countries--Australia, Jamaica, Guyana, Guinea, Surinam, Sierra Leone, and Yugoslavia--announced their agreement on March 8, 1974 to establish the International Bauxite Association (IBA) with headquarters in Kingston, Jamaica. The final communique expressed the intention of the participants to secure, on behalf of their peoples, "fair and equitable returns from the exploitation of their bauxite resources" and to secure "effective national control over their bauxite industries."[1] The same month, President Nixon directed that a special study be undertaken to "identify and assess potential threats to our supplies" of critical raw materials as "a basis for effective policy decisions." This study, prepared by an interagency task force under the joint direction of the Council on International Economic Policy and the National Security Council, pointed out that the U.S. is both a major importer and exporter of internationally traded raw materials. In 1973, our total trade in these commodities amounted to about $45 billion, roughly one-third of our total trade. Furthermore, the study stressed that, while on an over-all basis the U.S. dependency on imports of critical industrial materials is "modest, about 15 percent of our consumption", we are heavily dependent on imports for certain critical materials, notably bauxite, manganese, tin, natural rubber, mercury, flourspar, and columbium. In each instance, the U.S. currently

imports more than 50 percent of its needs. While over two-thirds of our industrial raw material imports come from Canada, developing countries are our principal suppliers of bauxite, manganese, tin, and natural rubber. Also, the U.S. relies on the U.S.S.R. for significant amounts of two important items--platinum group metals and chromium.[2]

Like the oil crisis in 1973-1974, formation of the IBA was a manifestation of a spreading movement by which states in the under-developed Third World are seeking to redefine their role in the world economic system and to gain a more nearly equal role in their relations with the industrialized nations. Specifically, they seek more favorable terms of trade with respect to their natural resources, technology transfers to help them modernize and diversify their economies, guaranteed earnings from their commodity exports, and debt amortization. Accordingly, in order to assess realistically the full implications of the creation of the IBA for the U.S., particularly the extent to which our economy might be vulnerable to collusive actions by members, one must examine the event in the context of the evolving politico-economic environment which impelled bauxite producers to establish an association.

This paper takes a look at the structure of the aluminum industry in the U.S. in light of the formation of the IBA, emphasizing specifically those characteristics that make it either vulnerable to IBA cartel actions or immune therefrom. It will examine alternative sources of supply for aluminum--the availability of bauxite from non-IBA members, exploitation of indigenous aluminous materials other than bauxite and the propects for more secondary recovery of aluminum

metal. In addition, the study will describe the emergence of the new spirit of economic nationalism in the Third World, the significance of OPEC as an example of successful cartel activity for the Third World to emulate, the formation of the IBA, and the essential ingredients for successful cartel formation. From this background, the paper concludes that, although by traditional standards, the U.S. aluminum industry should be relatively immune to collusive actions by IBA members, the new awareness of the true meaning of interdependence and the growing economic and political strength of the Third World require changes in U.S. policies to be more responsive to the strident demands of developing nations.

CHAPTER II

THIRD WORLD ECONOMIC NATIONALISM

In the post-World War II era, much of what has come to be known as the Third World gained its political independence from western colonial powers. Concomitantly, with independence these new states gained access to a broad spectrum of international fora where they could articulate their hopes and aspirations and vent their frustrations and anxieties. However, political freedom frequently did not bring with it a comparable measure of economic independence and, despite strenuous and continuing efforts, often with substantial assistance from former colonial powers, many of these new states experienced declining standards of living and mounting socio-economic instability. With regrettably few exceptions, the gap between the industrialized nations and the developing countries of the Third World has been growing wider. According to World Bank statistics, the average annual growth rate of the 25 countries with the highest per capita GNP during the period 1960-1972 was 4.63 percent, whereas the growth rate of the 25 poorest countries was only 0.83 percent.[3]

The very modest accomplishments of the first United Nations Development Decade were a great disappointment for the less developed countries (LDCs). Their frustration is reflected in frequent accusations by LDC leaders that their countries continue to be victims of western

"colonialist exploitation", that they are a source of cheap raw materials for the factories of the industrialized nations. The proliferation and growing power of multinational corporations headquarterd in the industrialized countries during the past 15 years, seeking tax havens, raw materials, and cheap labor, have tended to reinforce the sense of "exploitation" in the minds of Third World leaders. They are acutely aware of and sensitive to the imbalance of power in the totality of their relationships with the multinationals. More and more this perception has contributed to a growing determination in these Third World countries to seek redress through actions to curb the power of multinationals and pressures on the western industrial powers which have spawned them. These have taken several forms including a growing interest in an internationally accepted code of conduct for multinational corporations in general, and especially for those involved in exploiting primary resources.

Two decades of economic developmentalism essentially failed to accomplish the objectives being sought by the LDCs. In a United Nations study of problems of raw materials and development undertaken after the advent of the oil embargo and subsequent oil price increases, the Secretary General reported that the unit value of exports of manufactured goods rose by approximately 20 percent in both the 1950s and 1960s, whereas the index of primary commodity prices remained about the same in 1970 as it had been two decades earlier.

He concluded that the average terms of trade between the LDCs and the developed countries had experienced a marked deterioration. In

1970, exports of basic commodities accounted for 35 percent of the total of all goods entering into trade. Minerals and raw materials comprised about one quarter of this amount. The LDCs accounted for only 38 percent of the total exports of basic commodities while that of the developed countries were about 55 percent. But for the latter, exports of basic commodities accounted for just over 25 percent of the total value of their exports whereas for the LDCs, trade in basic commodities accounted for more than 75 percent of their total exports by value.[4] Similarly, UNCTAD economists calculated that the net barter terms of the underdeveloped countries had declined 12 percent between 1954 and 1970.[5]

When the Fourth Conference of Heads of States of Governments of Non-Aligned Countries convened in Algiers in September 1973, the stage was already set for launching concerted action against the industrialized nations. More than a third of the 2.6 billion inhabitants of the underdeveloped world were suffering from malnutrition or hunger; 800 million were illiterate.[6] The leadership in many of the 75 participating countries perceived latent, if not actual, threats from these disparities within their countries. Under the articulate direction of Algerian President Houari Boumediene, these Third World leaders found economic nationalism a useful ideological instrument for the political mobilization of their peoples in support of a "struggle against imperialism".

The economic declaration issued at the conclusion of the Algiers conference constituted a ringing indictment of the developed countries

and a clarion call for action to obtain redress for past inequities perpetrated against the non-aligned countries. It declared that "imperialist domination and neo-colonialist exploitation" represent a "threat to the sovereignty of developing states" and account for the "ever-increasing disparity between industrialized countries and the underdeveloped world." Noting the "failures of the First Development Decade", the "unsatisfactory implementation of recommendations of UNCTAD III," and the disappointing results of the first three years of the Second Development Decade, the report stated that the LDC share of world trade had declined from 21.3 percent in 1960 to 17.6 percent in 1970. It asserted that the transfer of resources from the developed countries to the LDCs was decreasing and that the volume of the latter's external debt has quadrupled during the 1960s to over $80 billion. The conferees projected that by the end of the current decade the average annual per capita income would be $3,100 in the developed countries and only $265 in the LDCs.[7]

In their report, the non-aligned leaders blamed the governments of "some developed countries" and the "behavior of some transnational firms" for having contributed to the inflationary rise in the cost of LDC imports and having caused increasingly severe balance of payments pressures. They also criticized the arms race and competition for space conquest which "continue to absorb large sums of money."[8]

The final resolutions of the conference reaffirmed "each country's inalienable right to the full exercise of national sovereignty over its natural resources and all domestic economic activities." The

conferees gave their "unreserved support to the application of the principle that nationalization carried out by States as an expression of their sovereignty, in order to safeguard their natural resources, implies that each State is entitled to determine the amount of possible compensation and its mode of payment and that any disputes which might arise should be settled in accordance with the national legislation of each State." Finally, they urged the formation of international commodity agreements and urged OPEC and CIPEC, an acronym from Spanish for the Intergovernmental Council of Copper Exporting Countries, to act to "recover natural resources for development purposes, and to raise the living standards of their peoples."[9]

The U.S. and other industrialized countries readily accept that, under international law, ultimate sovereignty over economic resources rests with the state, formal concession agreements with foreign corporations notwithstanding. Thus they do not deny that states have a sovereign right to take control over their resources from foreign companies, through nationalization or other means, provided they pay timely and equitable compensation for what they acquire. Most multinationals have come to accept these principles of international law, and aluminum companies, for example, have managed to negotiate reasonably satisfactory settlements with Jamaica for properties taken over after formation of the IBA.

The economic declaration and resolutions of the Algiers conference reflected meticulous advance preparation for inaugurating a coordinated effort by Third World nations to achieve economic sovereignty over their natural resources and to put an end to what

they regard as exploitation by the developed countries. There was no sign of equivocation by the non-aligned leaders in their announced intention to strengthen their bargaining position with the developed countries and the multinational corporations for the purpose of obtaining a larger share of the output of the world's economic activity. Although these concepts had been voiced previously, notably in the Lusaka Declaration on Non-Alignment and Economic Progress and the Action Program for Economic Cooperation adopted at Georgetown, there was a new stridency and assertiveness in the rhetoric during and following the talks in Algiers. The spectacular success achieved by the members of the OPEC shortly thereafter in dramatically reversing the downward trend in crude oil prices served to convince non-aligned nations that they had adopted a promising course for restructuring future relations with the industrialized nations and for accelerating their economic development. Establishment of the IBA a few months later was entirely consistent with the policies and recommended courses of action adopted at Algiers.

The positions endorsed at Algiers were only an opening move by the non-aligned nations to broaden the scope of their quest for new international economic relationships. Bouyed by his success at home, Boumediene soon took the initiative in calling for a Special Session of the U.N. General Assembly. In his opening address on April 9, 1974, Secretary General Waldheim said the main theme of the meeting should be to "secure the optimum use of the world's natural resources with the basic objective of securing better conditions of social

justice throughout the world." He cited six primary issues which require "immediate action"--poverty, population pressures, declining world food reserves, energy, military expenditures, and reform of the world monetary system to control inflation. He expressed the hope that "recent developments"--the oil crises, worldwide inflation, and famine--would impart a "sense of urgency" to the deliberations in New York and would provide a "new momentum to convert aspirations into active policies."[10]

The debate which ensued was noteworthy for the tone of confrontation between representatives of the industrialized and the underdeveloped nations, characterized by the press as the "North-South confrontation." Frequent reference was made of the phenomenon that, to a growing extent, the northern, industrialized countries were becoming increasingly dependent on primary commodities from southern, underdeveloped countries. The former, having been the first to industrialize, have already consumed a significant part of their original endowment of high-quality resources and are becoming increasingly dependent on imports from the LDCs. This fact is reflected in the rapid growth in the net flow of ores, minerals, and other raw matrials from the LDCs to industrialized countries. Competition among manufacturers in industrialized countries and multinational corporations for adequate supplies of essential raw materials, and the recent entry into the foray of additional latecomers to the ranks of industrialized countries is increasing pressures upon existing resources, lending greater import to the proclamations of the representatives of the LDCs.

Industry, and Tourism, called for a "new economic order" to correct

In the foregoing regard, some of the statements during the Sixth Special Session of the U.S. General Assembly have relevance to the case of aluminum/bauxite. In his initial statement, Boumediene, who presided over the Session, blamed the failure of the first phase of the International Development Decade on a "lack of political will on the part of wealthy countries." He pointed to substantial rises over the previous five years in the prices of many crucial commodities imported by the LDCs--steel (up three times), cement (up four times), wood products (up two and one-half times), wheat (up four times), sugar (up two times), and fertilizers (up two times). He then called for "nationalization of the exploitation of natural resources", an integrated process of development, including industrialization and expansion of agricultural production; greater international aid; and lifting the debt burden on LDCs, which he said amounted to $80 billion and on which the annual interest charge amounts to $9 billion.[11] The chairman of the delegation from Guyana, Minister of Foreign Affairs and Justice Shridath Ramphal, criticized the industrialized countries for failing to fulfill their commitments to the U.N. International Development Program and for negotiating prices for raw materials while being unwilling to negotiate prices for their products exported to the LDCs. The representative of Ghana echoed the same theme asserting that, despite a 250 percent increase in the price of cocoa during the preceding two decades, his country's net earnings had declined from £85.5 million to £77 million. Mr. P. J. Patterson, Jamaican Minister of Commerce, Industry, and Tourism, called for a "new economic order" to correct the imbalance between developed countries and the LDCs and to assure a

flow of "real income" to the latter. He termed past price relationships "unfair" to the LDCs and called for indexation of commodity prices.

The Sixth Special Session did not produce a consensus of both developing and industrialized countries on an agreed course of action to tackle the problems raised. The session ended with the adoption by a large majority of two resolutions declaring the establishment of and a program of action for a New International Economic Order (NIEO).[12] The U.S. strongly opposed both resolutions because of their imbalance, attributing, as they did, the problems which then beset the world's economy exclusively to the developed countries. Even the devastating impact of OPEC actions on many of the LDCs was attributed to an international economic system "established at a time when most of the developing countries did not even exist as independent states and which perpetrates inequality." Noting that sharp increases in the prices of essential imports such as food, fertilizers, energy products, capital goods, equipment and services had "gravely exacerbated the increasingly adverse terms of trade" of a number of LDCs, the NIEO action program called upon the industrialized countries and "other potential contributors" to provide immediate emergency relief to those most seriously affected by the economic crisis.

Two months later 46 African, Caribbean, and Pacific (ACP) countries met in Lome with the European Economic Community and concluded a convention which could become a landmark for future economic cooperation between the industrialized nations and developing countries.[13] The Convention, which became operative on January 1, 1976, establishes

a European Development Fund which will provide about $3.6 billion in grants and loans to ACP countries over the next five years, grants duty-free entry to most ACP exports to EC countries, and eliminates the reverse trade preferences previously insisted upon by the EC. But perhaps the most interesting concept in the Lome Convention is its export earnings stabilization program(STABEX). The program provides for compensatory payments to ACP states whose earnings from 12 commodities decline in the EC market. The list of commodities, which may be reviewed after one year, consists primarily of tropical products--groundnuts, cocoa, coffee, cotton, bananas, copra, tea, palm oil, hides and skins, wood products, raw sisal, and, as a special concession to Mauritania, iron ore. The convention specifically states, however, that the EC is "firmly opposed to the inclusion of mineral products in the list. . ." as a matter of principle. The STABEX arrangements of the Lome Convention are the first multilateral arrangements between rich nations and LDCs designed to stabilize export earnings, and they are likely to be part of the LDC proposals put forth at UNCTAD IV in May 1976.

The resolutions of the Sixth Special Session also set the stage for the adoption, at the twenty-ninth regular session of the U.N. General Assembly, of a Charter of Economic Rights and Duties of States.[14] Also, a Declaration and Plan of Action on Industrial Development Cooperation was adopted at the Second General Conference of UNIDO in Lima, Peru, March 1975.[15] Both the Charter and the Declaration express the determination of the Third World nations to continue their campaign

of pressure against the U.S. and other industrialized nations to alter terms of trade in their favor, to increase their individual and collective bargaining power, and to accelerate their economic development through a net transfer of resources and technology from the industrialized nations. In addition, the aforementioned documents reflect the concept of securing "permanent sovereignty" over natural resources through whatever means may be necessary. For example, Article 2 of the Charter affirms the right of every state to "freely exercise full permanent sovereignty, including possession, use, and disposal over all of its wealth, natural resources, and economic activities." In a direct challenge to multinational corporations, the Charter also affirms the right of a state to "regulate and exercise authority over foreign investment within its national jurisdiction. . ." and to "nationalize, expropriate or transfer ownership of foreign property. . ." under such circumstances as are deemed by the host government to be appropriate.

A spirit of confrontation was all too evident in the international fora where these basic economic issues were considered. During the same period, actions by OPEC, the IBA, CIPEC, and another newly-created producer cartel group, the Organization of Iron Ore Exporting Countries, heightened the sense of urgency with which the U.S. approached a new dialogue with the developing world and oil-exporting countries in the Conference on International Economic Cooperation (CIEC). Despite the forcefulness and persistence with which Third World countries continued to advance their demands, the U.S. had adhered to its basic position

on the question of permanent sovereignty. It supports the concept and recognizes the right of a state to nationalize property within its jurisdiction, provided that the exercise of national sovereignty is in accord with applicable transnational law. The U.S. supported and voted for U.N. General Assembly Resolution 1803 (XVII) in December 1962, the basic resolution on the subject of permanent sovereignty over natural resources. That resolution recognized both the rights of sovereignty in regard to natural resources and the constraints expressed in long-established principles of international law. Since that time, however, there has been no consensus in the U.N. on the permanent sovereignty issue. Ambassador Clarence C. Ferguson, Jr., restated the U.S. position on the question of permanent sovereignty at the Fourth Meeting of the U.N. Committee on Natural Resources in Tokyo on April 1, 1975. At that gathering, he termed recent U.N. formulations on permanent sovereignty "perniciously retrogressive" in the present world of interdependency. Furthermore, he stressed that they are clearly violative of accepted and developed principles of transnational law. But, regardless of the legalities of the issue, the U.S. believes that the recent U.N. formulations on the principle of permanent sovereignty over natural resources are simply bad policy since, if nations adhere to them, their actions could only result in discouraging the transfer of real resources through private investment.

At the Seventh Special Session of the U.N. General Assembly in September 1975, Third World rhetoric softened somewhat. Divisions within the Third World camp, the so-called "Group of 77", were apparent and a

genuine desire to reach a consensus on a resolution prevailed. The final document incorporated most of the proposals contained in Secretary of State Kissinger's address at the opening session. These include, inter alia, a development security facility to stabilize over-all export earnings of developing countries; assistance to developing countries in entering long-term capital markets; an international energy institute; and international center for exchange of technological information; and a world food-grain reserve system. The omnibus resolution also reiterated most of the same themes on terms of international trade, the transfer of real resources, development assistance, science and technology, industrialization, food and agricultural development, monetary reform, and restructuring the U.N. system.[16]

In contrast to the position taken at the Sixth Special Session, however, this time the U.S. and certain western industrialized countries agreed generally in the results, although they announced reservations on various points in the resolution. At a press briefing in Cincinnati on September 17, Secretary Kissinger noted that the Seventh Special Session had ". . . ended a period of confrontation for the time being between the developing. . . and the developed countries, and at least created an opportunity for the process (dialogue) to go forward on a cooperative basis."

The new tone of realism and a heightened desire to reach accommodation on crucial international economic issues evidenced by both sides during the September meeting was present throughout the thirtieth regular session of the General Assembly. It also prevailed at the CIEC talks in December between heads of states and governments representing the

developed and developing countries. At this second Paris meeting, the U.S. sought to have the four CIEC commissions on energy, raw materials, development, and related financial issues, to consider seriously by many of its proposals advanced at the Seventh Special Session that had not yet been implemented. Although the difficult issues raised by the Third World are not likely to be resolved quickly or painlessly, both sides made it clear that they wished to back away from the maximum positions advanced at the initial CIEC meeting. Third World feelings of injustice, discrimination, and exploitation are deeply held, and, for the first time, many poor countries are convinced that inter-dependency, especially the growing dependency of the industrialized countries on Third World resources, has gone a long way toward re-dressing the historic imbalance of power between producers of raw materials and consumers. They are well aware that the U.S. and other industrialized countries must have assured, uninterrupted supplies of essential minerals to maintain their vital economic and political interests. The LDCs which have such resources are determined to use their endowment to acquire greater political influence and meaningful participation in a process of changing the structural asymmetries of the world system as well as to assure more rapid economic development.

The successful action of the OPEC countries serves as an inspiration and perhaps as a potential source of financial assistance for attempts by producers of other primary commodities to act in concert to regain control over their resources from foreign-based multinational corporations. Although there have been many previous attempts by such

producers to influence the terms of trade through international commodity agreements and other cartelization arrangements, until OPEC all had had little success in realizing their purposes. Even nationalization and expropriation often resulted in decreased revenues when competitors proved susceptible to offers to supply the material requirements of multinational firms whose properties had been taken over. Before examining the situation with respect to the aluminum industry, therefore, it is useful to take a more detailed look at the OPEC case to determine the extent to which it is unique and the extent to which it may prove to be a model for other producers to emulate.

CHAPTER III

OPEC: A MODEL FOR PRODUCER CARTEL FORMATION

The concerted action by the members of OPEC in late 1973 and early 1974 to more than quadruple the price of crude oil in international trade has been compared to the Russo-Japanese war in 1905. In that conflict, a European power was defeated for the first time by a non-European nation.[17] OPEC's actions represented the first time that a group of LDCs had achieved a significant victory over the advanced countries in the economic realm. How did it happen and why did the West fail to anticipate such a momentous development?

The first unindustrialized country to succeed in wresting control of its national oil production from the hands of international oil firms was Mexico, which nationalized all foreign-owned oil companies in 1938. Consideration of similar moves by Venezuelan authorities never produced any results. The development of Arab oil resources in the Persian Gulf region during World War II led the League of Arab States to urge creation of an association of Arab oil producing countries as early as 1945. The League's interest in this issue, however, waned as more and more of its energies were consumed by the passions unleashed by the creation of Israel in 1948. But Venezuela continued to seek Arab support for a broader association, and during the 1950s oil producing countries increasingly found their efforts to secure higher revenues

from the exploitation of their reserves of black gold frustrated by the overwhelming power of the global oil companies.

By the late 1950s the international crude oil market was very weak. A large surplus production capacity existed, stiff competition among the multinational oil companies existed, and substantial discounts off the posted prices for crude oil were being offered. Further depressing the market for Middle East crude was action taken by the U.S. to introduce compulsory controls over its oil imports, allegedly to reduce dependence of foreign supplies. In an effort to stimulate demand for Middle East oil, the multinational oil companies unilaterally reduced the posted price for Arabian light crude from $2.08/bbl. to $1.90/bbl. in February 1959. They imposed a further reduction in August 1960 to $1.80/bbl.[18] The net result of these actions was to reduce the revenue of the producer governments by nearly 15 percent. Iran, Iraq, Kuwait, Saudi Arabia, and Venezuela responded by establishing the Organization of Petroleum Exporting Countries (OPEC). Membership in the organization would be available to other countries which were "substantial net exporters of crude petroleum" and which had "fundamentally similar interests" to those of the existing members. Qatar joined OPEC in 1961; Libya and Indonesia were admitted in 1962.[19]

OPEC first took up the price problem, the issue which had been the proximate cause for establishing the organization. Before the end of the year, it had reached a firm agreement with the multinational oil companies that there would be no further reductions in posted prices. In fact, the $1.80/bbl. price remained unchanged until February 1971. During the 1960s OPEC carefully avoided the tricky question of

establishing production quotas and concentrated its efforts on other issues. It scored its initial breakthrough on the sensitive question of expensing royalty payments in 1964. Previously, royalties paid under the terms of the concession agreements had been treated as if they were tax payments. Throughout the decade of the 1960s OPEC backed Iraq, Libya and Algeria in their individual negotiations with oil companies over nationalization, modifications to concession agreements, higher prices, minimum production levels, etc. The effort by Arab members of OPEC to embargo oil shipments to the West at the time of the June 1967 Middle East war failed, largely because the U.S. then had sufficient surplus crude production capacity to become the supplier of last resort to western Europe and Japan.

By the beginning of the current decade, the international market situation for oil was changing rapidly. Worldwide demand for oil and natural gas was increasing rapidly. In Western Europe alone, for example, the demand increased by nearly 40 percent during the period 1967-1970.[20] Simultaneously, coal production was declining and nuclear energy was not developing nearly as rapidly as had been expected. The exciting discovery of oil under the North Sea had not lived up to initial expectations and capital costs of development vastly exceeded original projections. Environmental constraints were hampering exploration and development efforts elsewhere, especially in the U.S. Then a series of events occurred in 1970:

--A syrian tractor damaged the Trans-Arabian Pipeline (Tapline) causing a loss of 480,000 bbls/day of crude available in the eastern Mediterranean.

--The new government in Libya imposed a 600,000 bbls/day production cutback to pressure foreign oil companies into signing a new agreement. Libyan strongman Qadhafi succeeded in eliciting substantial concessions from Occidental Petroleum and then other oil companies in September.

--U.S. production of crude oil peaked and began to decline.

These developments, coupled with the realization that new discoveries and additions to proved reserves outside the Persian Gulf area were not keeping pace with rising demand, greatly strengthened the bargaining power of OPEC. After extended negotiations, the oil companies reached an agreement with the Shah of Iran in February 1971 to raise the posted price for Arabian light crude, which serves as a standard for crude oil prices worldwide, for the first time since OPEC was established.[21] The agreement was to last for five years and contained an agreement for a 2-1/2 percent annual increase to offset inflation. By threatening to embargo any company that refused to accept the terms of the Tehran agreement, OPEC was able to extend the higher prices, royalty, and tax payments to all of its members.

The Tehran Agreement can be regarded, in retrospect, as a key turning point in the gradual shift of effective power from the oil companies to the governments of the oil producing countries. During the next 2-1/2 years, the arms length price of crude oil went up 65 percent on the world market. The devaluation of the dollar and inflation of prices of both commodities and industrial imports seriously eroded the value of the revenues received by producer countries. Moreover the free market price of crude oil increased almost 100 percent in the 18 months preceding the October 1973 war. OPEC noted with interest

that the oil companies experienced no difficulty in passing their higher prices along to consumers with little apparent impact on consumption. In fact, the rate of increase in over-all consumption in the U.S., Western Europe, and Japan was not even perceptibly slowed.

Asserting that substantial changes in the international situation made the Tehran Agreement no longer operative, OPEC increased the posted price to $5.12 in mid-October 1973 and then to $11.65 in January 1974. Concomitantly, the Arab oil embargo and production cutbacks occasioned by the Arab-Israeli war produced a wave of panic buying which drove the auction price of crude as high as $17.00/bbl. at one point. Even though some excess production capacity began to develop in 1975 and there has been some minor cheating on the OPEC price by Iran, Iraq, and Libya, there has been no serious challenge to OPECs hegemony over the international market in oil by the industrialized countries of the multinational oil companies. The short-run relative inelasticity of demand for petroleum products has been unequivocally established.

CHAPTER IV

THEORY OF CARTEL FORMATION

While the impressive success achieved by the major oil exporting countries in establishing an international cartel and using it to fundamentally change the conditions for obtaining access to their petroleum resources has been the subject of extensive analysis both in economics texts and popular journals, little serious research has been devoted to developing a general theory of producer cartel formation that adequately considers the accelerating politization of international economics. Most standard works on international economics look at the subject only in the general context of barriers to trade. Such texts fail to take into account some of the unique aspects of the OPEC situation and of the new relationships between LDC exporters of primary commodities and the industrialized countries. Discussion is often confined to private cartels, whereby manufacturing firms colluded to limit competition and maximize profits. These cartel arrangements were common during the 1920s and 1930s and resorted to such practices as price discrimination (setting different prices in different markets to exploit differences in elasticities of demand), market allocation among cartel members, obstruction of entry into the field, and a variety of other restrictive practices.

In the U.S., concern over the expansion of international cartel activity mounted during the 1930s. By 1940, it was widely felt in Washington that such restrictive business agreements, many of which had been formed at the initiative of I. G. Farben and Krupp, had helped bring Hitler to power. Therefore, since Hitler had launched World War II, cartels were a, if not the, source of German aggression. In fact, subsequent investigations revealed clearly that the Nazi regime had indeed used the cartel connections of its nationals to further German war aims.

Two examples are sufficient to illustrate the U.S. antipathy toward manufacturing cartels. In 1928 Krupp entered into a patent-pooling agreement with General Electric which allowed the latter to set a price range of $360-$453/lb. for carboloy, a cemented tungsten carbide product used to harden the metal tips of cutting tools. Before the agreement, Krupp sold carboloy in the U.S. market at $50/lb. During World War I, the U.S. greatly increased its capacity to produce magnesium metal. When the demand dropped precipitously at the end of the war, all but two companies--Dow Chemical and Alcoa--ceased production. Since magnesium had become competitive with aluminum, the two companies entered into an arrangement whereby Alcoa would stop manufacturing magnesium and henceforth acquire all of its requirements for the metal from Dow at a preferential price. In 1931, I. G. Farbenindustrie entered the U.S. market through a partnership with Alcoa. Although the latter had developed a cheaper process, cross-patenting arrangements and market distribution agreements allowed Alcoa to keep the price high

enough so that magnesium would not become a substitute for aluminum. As a result, magnesium was in short supply at the beginning of World War II.

Sometimes, the economics texts focus on international commodity agreements usually formed in an attempt to reduce the wide price fluctuations that have been common for many primary commodities and agricultural products. The series of International Tin Agreements and agreements covering cocoa, tea, and coffee are examples of these arrangements. Unfortunately analysis of these past practices is of only limited value in considering current actions by Third World nations to form producer cartels such as OPEC or, more recently, the IBA. Many of the traditional economic factors that have led to the failure of the past cartel efforts may well no longer operate with the same force.

Historically, cartels and other arrangements for collusive action in international trade in commodities have failed because companies or governments have often found that demand elasticities have been greater than they had thought. Substitute products are found or developed which cause a sharp decline in demand for the original commodity. Also, artificially-maintained high prices have had the effect of increasing the elasticity of supply from outside the cartel group. Sources of supply which had not been judged economic under free market conditions are developed or an intensified search for alternative sources of supply leads to new discoveries. These factors taken together bring about a decline in purchases from cartel members, and as the quantity of product demanded from the cartel members shrinks, they usually find it

impossible to allocate production cutbacks satisfactorily. A price war may ensure, or other measures may be taken by individual members which undermine the cartel arrangements. As the strains upon the cartel grouping increases, its effectiveness is gradually eroded.

Past experience shows clearly that the absolutely essential ingredients for an effective cartel are tight control over supply and unanimous agreement among members on production cutbacks to maintain agreed prices. Ideally the market should be dominated by a small number of producers, for the more participants there are, the harder it is to maintain discipline. If a significant surplus capacity exists in one place, the rewards for holding back supplies in another are diluted. For example, in 1962 cocoa exporting states formed the Cocoa Producers Alliance (COPAL). Two years later the members agreed to limit sales to levels that would keep prices above 20 cents a pound. From the outset, however, two members, the Cameroons and the Ivory Coast failed to abide by the agreement. Consequently, other producers soon found themselves accumulating large stocks of cocoa and confronting a weakening market. By early 1965, Ghana, the largest producer, found it could no longer continue to restrict sales and the controls were abandoned. Cocoa prices fell to a low of 11 cents a pound by June and the consequent drop in Ghana's foreign exchange earnings contributed to the overthrow of the Nkrumah regime.

With respect to the OPEC case, it is evident that surplus production capacity exists and there are oil economists, notably M. A. Adelman of M.I.T., who argue forcefully that the same forces which have

brought down past cartels will be the undoing of OPEC. Perhaps he is right; but many observers, including this writer, don't think so! A relatively inelastic demand for oil in the short run, the low elasticity of supply from sources outside OPEC, and the lack of difficulty in allocating production cuts suggest that OPEC will remain the dominant force in the international oil field for many years. Saudi Arabia, which possesses more than 25 percent of the proved world reserves of petroleum, has little incentive to increase production beyond a level that can be marketed at the agreed OPEC price. In fact, some Saudi officials believe production should be cut back to a level that would produce just enough income to meet Saudi requirements for internal development and foreign assistance. Shaykh Ahmad Zaki Yamani, the Saudi Oil Minister, for example, drawing upon his Harvard Business School training, has been known to contend that his government can realize a greater return on its oil resources by leaving them in the ground to appreciate in value than by generating surplus revenue and making equity or portfolio investments. Since Saudi Arabia would realize all the income it could conceivably spend effectively from production at a level of 4.5-5.0 million bbls/day, vice the current production of a little less than 7.0 million bbls/day,* OPEC's prospects for allocating production in a situation of temporary surplus capacity appear good. OPEC's power will only wane when alternative sources of energy have been developed and are available at lower cost than OPEC oil. And even then, oil will continue to be an essential feedstock for the very important petrochemical industry.

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*Aramco's output in 1975 averaged 6.8 million bbl/day, off 16.8 percent from 1974 production.

CHAPTER V

ESTABLISHMENT OF THE INTERNATIONAL BAUXITE ASSOCIATION

It is clear that OPEC actions during the October 1973 Middle East war and in early 1974 were the ultimate stimulus for a number of Third World states to get together and establish an international association of bauxite-producing countries patterned after the OPEC model. Jamaica and Guyana, two of the major bauxite producers, had long been seeking acceptance by the large aluminum companies of more generous terms for exploiting their resources. Both had also been active in the Third World effort to induce the U.N. to support a comprehensive international action program to bring into being a new economic order, one that would enable Third World states to improve their economic lot. Although in a number of important respects that will be detailed below the bauxite picture differs markedly from that of oil, the establishment of the association should be regarded in the context of the new "economic nationalism" described above.

Following a preparatory meeting in Belgrade in November 1973, Ministers from seven bauxite-producing states--Australia, Jamaica, Guyana, Guinea, Surinan, Sierra Leone, and Yugoslavia— convened in Conakry, Guinea in March 1974 and agreed to form the International Bauxite Association (IBA). According to the official communique issued

at the end of the deliberations, the objectives of the IBA were to "secure on behalf of their peoples fair and equitable returns from the exploitation of their bauxite resources. . ." The Ministers also reached agreement on an objective of "securing effective national control over their bauxite industries and of maximizing national ownership of such industries." And they will "endeavor to ensure that the operations. . .of multinational corporations in any member country. . .will not be permitted to damage the interests of another member country." In their communique, the Ministers added that, in pursuing the objectives of the IBA they will "bear in mind the recognized interests of the consumers of bauxite products."[22] The agreement contains no provision for establishing a buffer stock or for instituting export controls designed to stabilize prices. The agreement was not directed against any single country or group of countries, according to its members, but against an "unjust system." No provision was made for consumer countries to join the association. Kingston, Jamaica was designated to become the headquarters of the IBA.

The Council of Ministers of the IBA held its first regular session in Georgetown, Guyana in November 1974. At that meeting three additional members were taken into the Association--Ghana, Haiti, and the Dominican Republic. The ten members account for more than 65 percent of world bauxite production and over 80 percent of world trade in bauxite/alumina. See Table 1 for data on world bauxite production and reserves.

TABLE 1

WORLD BAUXITE PRODUCTION AND RESERVES
(Thousand Long Dry Tons)

	Mine Production			Reserves
	1973	1974	1975(e)	
United States.....	1,879	1,949	1,800	40,000
Australia.....	17,535	19,740	20,000	4,500,000
France.....	3,084	2,863	2,900	60,000
Greece.....	2,600	2,957	2,700	750,000
Guinea.....	3,000	6,500	7,000	4,500,000
Guyana.....	3,224	3,100	2,400	150,000
Jamaica.....	13,385	15,086	12,500	1,000,000
Surinam.....	6,580	7,000	5,800	500,000
Other Free World....	9,292	7,632	6,200	4,850,000
Communist countries. (Except Yugoslavia)	7,689	10,171	9,700	650,000
World Total	68,268	76,989	71,000	17,000,000

(e) Estimate

SOURCE: Bureau of Mines, Commodity Data Summaries, 1975 & 1976

The communique issued at the conclusion of the Georgetown meeting noted that the Ministers had focused principally on the "complex and difficult questions of bauxite and alumina valuation, pricing and taxation." They appointed a Committee of Experts and a Working Group

to continue examination of these issues. There were also hints that the IBA would look into the problem of trying to work out a common pricing formula for bauxite. If, despite the difficulties of developing a formula based on mining and shipping costs and ore grades, a common floor price could be agreed upon, it would represent a significant step by bauxite producers towards cartel pricing. Finally, the communique stressed that the IBA would seek a broad membership amongst "developing bauxite producing countries."

Jamaica, which together with Guyana had spearheaded the movement to create the IBA, was the first member to act against the international aluminum corporations to correct what had been termed as the "unjust system". On March 15, 1974 it summoned the aluminum companies to negotiations on a wide range of demands designed to greatly increase the country's revenue from Jamaican bauxite and alumina exports. The Jamaicans had carefully studied the aluminum industry and put together an innovative proposal whereunder their revenue would be based on the realized price of aluminum ingot and not on the amount of profit ascribed by the companies to their subsidiaries in Jamaica. From all reports, it would appear that they had also made careful calculations on how much cost increase in bauxite would be tolerated before the companies would make necessary investments to get their alumina from other countries or from materials other than bauxite.

The companies were less well prepared for negotiations with the Jamaicans. They appear not to have correctly assessed the determination of the Jamaicans to realize their objectives and the

new feeling of confidence which the OPEC experience and the establishment of the IBA had given them. No agreement was reached, although the companies did accept the principle of basing payments on the realized price of aluminum ingot. In June, the Jamaican legislature unilaterally set the levy and royalty payments that the companies would have to make, retroactive to January 1. The royalty was doubled from 28¢ per ton to 56¢, and a variable production levy of 7-1/2 percent of the realized price of aluminum ingot was imposed. These new levies resulted in an increase of the tax paid on bauxite mined in Jamaica from about $2.50 per ton to nearly $15.00. To discourage companies from scaling down production in Jamaica in order to avoid the tax, the new law also provides that each company's quarterly tax payment can be no less than the tax on the minimum tonnage of bauxite that it is required to produce in Jamaica each quarter. The minimum production level for each company was to have been 105 percent of its actual production in 1973. Because of the worldwide slump in aluminum demand in 1974 and 1975, however, Jamaica has apparently permitted the aluminum companies to reduce their output below the minima, provided they make pro rata reductions in all bauxite producing countries. Kingston also announced its intention to acquire 51 percent ownership of the mining operations in the country.[23]

Following Jamaica's lead, most of the other members of the IBA acted to increase their levies on bauxite. Guyana's new tax legislation contains a production levy formula nearly identical to the Jamican formula, and henceforth the tax rate per ton of Guyanian bauxite will be the same as that of Jamaica. Guinea and Surinam increased their

bauxite levies substantially, though less than Jamaica and Guyana, to $6.45 and $11.00 respectively. These amounts are based on a market price of aluminum ingot of 39¢ per pound and recently announced price increases for aluminum will result in higher royalty payments. The Dominican Republic and Haiti have also raised the amounts of their levies on bauxite production but, according to Department of State officials, their actions are preliminary and informal in nature. The understanding between the governments of these countries and the aluminum companies involved is that the final tax decisions will be made when the appeal of Alcoa, Kaiser, and Reynolds to the International Center for the Settlement of Investment Disputes for arbitration of their dispute with the Government of Jamaica is finally resolved.

The only major bauxite and alumina exporting country that has not made major changes in its bauxite and alumina taxes since 1974 is Australia. The Province of Queensland raised its levy on bauxite from 10¢ to $1.00 per ton and its tax on alumina exports to 50¢ per ton in 1974, and recently the bauxite tax was further increased to $2.40 per ton. Western Australia, however, has refused to change its mining tax policies and its Liberal Party Premier, Sir Charles Court, has been outspokenly critical of the national government's decision to join the IBA. There are reports that Guyana, which supports an aggressive price policy for the IBA, is unhappy with the Australian attitude, and that at the next meeting of the organization "intends to vigorously arrange a format in which Australia could be forced to declare its real attitude toward the cartel."[24]

Cries of anguish from the aluminum companies over the effects of the increases in taxes by IBA members have tended to obfuscate the real impact of the action. While it is true that the higher levies have raised the delivered price of bauxite to the U.S. from Caribbean producers by about 150 percent, these higher prices are still small in relation to total costs. The tax and royalty payments represent only about seven percent of the cost of primary aluminum per ton.

A brief look at the importance of bauxite production for the Jamaican economy helps to place in perspective the positions advanced by the Jamaicans in their negotiations with the aluminum companies. In 1971 Jamaica had earned about $2.83 per ton of bauxite mined; by 1973, the return had fallen to about $1.61. In the latter year, production of bauxite and alumina accounted for about 15 percent of Jamaica's GNP and over 50 percent of its visible exports. Jamaica was receiving for its bauxite about 1.6 percent of the price received for aluminum ingot. At the same time, the Jamaicans were well aware that oil producing countries were receiving about 45 percent of oil revenue. When OPEC raised the posted price of crude oil in October 1973 and January 1974, it had the effect of raising Jamaica's oil bill from about $50 million in 1972 to at least $150 million in 1974. And to make matters worse, from the Jamaican point of view, while bauxite prices were declining, the market price of aluminum ingot rose 22 percent.[25] In light of all of these trends, it is not difficult to appreciate the determination of the Jamaicans to negotiate more favorable terms for the exploitation of their most important material resource. Indeed, Prime Minister Manley

really had no viable alternative; he had to increase his government's income substantially or risk economic decline and political turmoil.

Is the IBA a paper tiger; a transitory effort by a heterogeneous group of have-not nations that is destined to collapse, sooner rather than later? Perhaps. But available evidence suggests that the factors which have had the effect of mobilizing the Third World into a more cohesive and influential force on the world scene are likely to strengthen support for actions by groups of underdeveloped countries that seek to improve their terms of trade and secure a greater return from the exploitation of their natural resources at the expense of industrialized countries and multinational corporations. A sense of injustice is deeply felt in the Third World--a feeling which often translates itself into a conviction that wealthy nations could not have become so if they had not been able to exploit the resources of others.

The industrialized countries are not the only ones who appreciate the significance of the new codeword "interdependence"; the LDCs also understand that the complex socio-economic system that the world has developed means their resources have suddenly become much more valuable to consumers. And if the U.S. aid programs to the LDCs have done nothing else during the past 25 years, they at least have taught leaders in the Third World the operations of the law of supply and demand. Thus, if industrialized countries such as the U.S. wish to be assured of access to crucial raw materials and, perhaps equally important, to have access to growing markets in the Third World for their manufactured goods,

it may well be prudent not only to acknowledge the changing balance of power but also to take the lead in encouraging the successful negotiation of more generous arrangements. A detailed look at certain aspects of the aluminum industry, both domestic and international, will reveal the strengths and weaknesses of the U.S. economy with respect to the IBA.

CHAPTER VI

THE U.S. ALUMINUM INDUSTRY

Aluminum is the most abundant metallic element comprising about eight percent of the solid portion of the earth's crust. There is no part of the world where extensive aluminous ores are not found. Metallic aluminum, however, does not occur in nature. Rather it is found in the form of aluminum oxides that are a component of various ores. These oxides, called alumina or corundum when purified, vary widely in concentration and ease of refining. By far the richest source of alumina (Al_2O_3) is the ore bauxite which contains from 35 percent to 55 percent alumina. Bauxite is a heterogeneous material composed primarily of gibbsite, a trihydrate of aluminum oxide ($Al_2O_3 \cdot 3H_2O$), and of monohydrates ($Al_2O_3 \cdot H_2O$) of aluminum oxide called boehmite and diaspore. Iron oxides, aluminum silicates, and titanium oxides are the principal impurities.

Bauxite is the primary source of metallic aluminum manufactured with present technology, although the Soviet Union and some Eastern European countries employ a process for extracting corundum and aluminum from the ore alunite. There are three general types of bauxite: Jamaican, Surinam, and European. Jamaican bauxite is a mixture of both trihydrate and monohydrate minerals. It contains approximately 50 percent Al_2O_3, one-two percent silica, and 20-30 percent iron oxide. Surinam

bauxite is mainly trihydrate gibbsite, usually containing 50 percent or more Al_2O_3, 2-15 percent silica, and 5-15 percent iron oxide. European bauxite contains the monohydrates boehmite and diaspore, and is approximately 55 percent Al_2O_3, four percent silica and 10-20 percent iron oxide. Because of these differences in the chemical composition of the different types of bauxite ore, facilities built to process one type of ore cannot easily be adapted to processing ores from different locations that possess different chemical characteristics. This feature has been a factor encouraging the establishment and development of relatively large, highly-integrated aluminum corporations.

The stages of production of aluminum from bauxite are mining, bauxite beneficiation, extraction of alumina, and smelting of primary aluminum. Open pit mining accounts for more than 80 percent of world production. Although bauxite deposits are widespread throughout the world, commercial exploitation has been concentrated in areas of high quality--40-50 percent Al_2O_3--bauxite. More than 60 percent of world bauxite production in 1973 took place in Australia, Jamaica and Surinam. Since the ratio of aluminum to alumina to bauxite averages 4.5 to 1.93 to 1, high-quality bauxite has an effective "oregrade" of about 20 percent, as opposed to zinc, with five percent, and copper, where ores containing concentrations as low as 0.2-0.4 percent are now being processed.

The beneficiation process consists of washing the mined ore to remove silica or clay materials. The ore is then crushed and dryed before transporting. Sometimes a magnetic process is used for bauxite destined for non-metallurgical uses.

Virtually all commercially produced alumina is obtained by the Bayer process involving a caustic leach of bauxite at high temperature and pressure, followed by separation and precipitation. It is this stage of the over-all processing to obtain aluminum metal that must be adapted to the different kinds of alumina bearing ores. The Bayer process yields alumina that is 99 percent pure. A little less than 20 percent of the alumina produced is used as an abrassive (carborundum), in glassmaking, and in making electrical insulators and spark plugs. The balance becomes the basic feedstock for aluminum smelters. Investment costs for a plant to extract pure alumina are considerable--approximately $600-$800 per ton of capacity, according to Bureau of Mines estimates. And to achieve essential economies of scale, the most efficient size for an alumina plant is one with at least 330,000 tons capacity.

Primary aluminum is produced by the electrolysis of alumina in a molten bath of cryolite ($3NaF \cdot AlF_3$), the Hall-Heroult process developed in 1886. New processes are constantly being examined, but none have yet been demonstrated to be commercially superior to the Hall-Heroult system. Two new processes, the Quebec and the Pechiney, involve direct reduction of bauxite. Small pilot plants are in operation, in Canada, France and the U.S. (at Frederick, Maryland). An aluminum smelter is comprised of one or more potlines, each of which contains 125-150 individual electrolytic cells. These reduction cells operate continuously, although alumina can be added and molten metal withdrawn in batches. The optimal size for an aluminum smelter is about 100,000 tons per year capacity, and investment costs are high, $1,500-$1,600 per ton of capacity per year.

One of the most striking characteristics of the international aluminum industry is the concentration of bauxite ore production in the developing countries and that of alumina and of aluminum smelting in the industrialized countries. As noted above, the members of the IBA account for four fifths of the total free world bauxite production. Although since 1971 Australia has been the largest single producer, more than half is mined in the LDCs. On the other hand, three-quarters of the alumina and more than 90 percent of the primary aluminum are produced in developed countries. This characteristic is unlikely to change significantly in the short run, although the share of the bauxite-producing countries in alumina production will undoubtedly increase. Furthermore, some additional primary smelting capacity in the LDCs seems probable, if sufficient energy at reasonable prices is available.

A second important characteristic of the aluminum industry is the concentration of production capacity in a few large, vertically-integrated, transnational corporations. Six corporate groups and their affiliates account for well over half the world's primary aluminum capacity: Aluminum Company of American (Alcoa, with headquarters in the U.S.); Alcan Aluminium Limited (Alcan, with headquarters in Canada); Reynolds Metals Company (Reynolds, with headquarters in the U.S.); Kaiser Aluminum and Chemical Corporation (Kaiser, with headquarters in the U.S.); Pechiney Ugine Kuhlmann S.A. (Pechiney, with headquarters in France); and Schweizerische Aluminium A.G. (Alusuisse, with headquarters in Switzerland). According to U.N. statistics, these six industrial giants accounted for 57 percent of the free market bauxite production capacity, 70 percent of the alumina refining capacity, and 60 percent of

its primary aluminum smelting capacity in 1973.[26] See Table 2 for these companies' shares of world production capacity.

In the past, these companies controlled within their corporate structures access to their bauxite requirements and outside transactions were infrequent. Authorities in the bauxite producing countries have contended for a long time that these integrated companies were guilty of concealing the true value of the bauxite they extracted from their holdings in order to reduce royalty and tax payments. IBA members' moves to acquire national control over their domestic bauxite industries will impact on this aspect of the aluminum industry. However, the companies will still have their own fabrication facilities, and they sometimes control related supplies such as power and shipping facilities. Thus, even though the trend toward government control over, if not ownership of, majority interest in bauxite-producing facilities appears irreversible, the companies are likely to remain an important factor in bauxite mining for a long time to come.

There are twelve domestic primary aluminum producing companies with an estimated capacity of just over five million tons. The three largest, Alcoa, Reynolds, and Kaiser, account for two-thirds of this capacity. The aluminum fabricating sector of the industry is more diverse and less dominated by the major primary producers. Shipments are classified into wrought products and castings. The former consists of various grades of sheet, plate, and foil (60%); extruded products--rod, bar, pipe, and tubing, and a wide variety of shapes, sizes, and forms of aluminum for user industries (22%); rolled and continuous cost rod,

TABLE 2

SUMMARY OF WORLD ALUMINUM PRODUCTION CAPACITY, 1973

Ownership	Bauxite 1,000 l.t.		Alumina 1,000 s.t.		Primary Metal 1,000 s.t.	
Alcoa	12,050		5,617		1,835	
Kaiser	11,650		3,116		1,373	
Reynolds	7,850		3,154		1,060	
Alcan	5,500		3,728		1,683	
Pechiney	4,350		2,420		995	
Alusuisse	3,250		889		767	
Subtotal	44,650	55%	18,924	59%	7,713	53%
Other private companies	21,050		6,539		3,693	
Total companies	65,700	74%	25,463	79%	11,406	78%
Government:						
Communist	9,750	11%	4,666	15%	2,362	16%
Non-Communist	13,000	15%	2,033	6%	867	6%
Total Government	22,750	26%	6,699	21%	3,229	22%
Grand Total	88,450		32,162		14,635	

SOURCE: Bureau of Mines, Minerals Yearbook

bar, and wire (12%); and small quantities of drawn tubing, powder, flake, and paste products, and forgings. The aluminum castings subsector of the industry is dominated by producers of secondary aluminum.

In 1974, the U.S. imported over 15.8 million tons of bauxite, nearly 90 percent of its requirements. Approximately 90 percent of these imports were from IBA members. Preliminary figures compiled by the Bureau of Mines indicate that imports were down substantially in 1975, to about 12,700 tons, reflecting the sharp decline in demand for aluminum products caused by the recession. The principal sources of imports were Jamaica (52%), Surinan (21%), the Dominican Republic (8%), and Guyana (7%). In that year, the U.S. also imported about 3.6 million tons of alumina, primarily from Australia (54%), Jamaica (24%), and Surinam (15%). All of these countries are members of the IBA.

There are substantial high-quality deposits of bauxite in countries not belonging to the IBA. The two most important, in terms of the size of their deposits, are Brazil and the Cameroons. Brazil has estimated reserves of about 1.2 billion tons, or roughly seven percent of the known world reserves of bauxite. Production was nearly one million tons in 1974 and the government is pushing ahead with ambitious plans for the development of additional mining in the Amazon valley.

At this time, the delivered cost of bauxite from Brazil to the U.S. is about $2.00 per ton more than that for Jamaican ore. Costs of bauxite from the Cameroons are somewhat higher.[27] Both Brazil and the Cameroons have been approached to join the IBA, but there has been no indication, thus far, that either country is seriously considering

so doing in the near future. Rather, it would appear that both have concluded that their chances of rapidly developing their domestic bauxite production capacities will be greater if they remain outside the cartel, especially in a period of excess capacity and weak demand. If the current economic recovery proves to be strong and lasting, and if the demand for aluminum strengthens to the extent some industry analysts predict, shortages could develop by 1977 or 1978. In this event, both Brazil and the Cameroons might find it advantageous to join the IBA in a move to achieve uniform increases in realized returns from bauxite production.

Some bauxite is mined in the U.S., about 1,800 tons in 1975. Eighty-five percent of domestic production came from Arkansas. The remainder was produced in small mining operations located in Alabama and Georgia. U.S. reserves of bauxite are modest and incapable of meeting demand. The U.S., however, possesses large quantities of non-bauxite, aluminum-bearing ores which contain an average of 27 to 35 percent alumina content. Table 3 lists the major potential domestic sources of alumina. Several processes have been developed that are capable of refining non-bauxitic ores, but none have been commercially competitive with bauxite up to now.

Precise data on the cost of producing alumina from non-bauxite ores are unavailable, in part because full-scale commercial production has not yet been tried and in part because such data are closely held trade secrets. Nevertheless, some experts have estimated that delivered costs of foreign bauxite in the U.S. could rise to at least $45 a ton

TABLE 3

MAJOR POTENTIAL DOMESTIC SOURCES

OF ALUMINUM

Source	Quantity Million st. tons	Alumina Content Quantity	Alumina Content Percent
Alunite	800	120	15[1/]
Anorthosite	599,490	153,342	27
Clays			
Ball	813	243	30
Bauxitic	297	125	42
Fire	8,276	2,275	27
Kaolin	3,288	1,076	33
Dawsonite	27,000	9,500	35[2/]
Laterite	1,313	384	29
Aluminum Phosphate			
Rock	800	164	13
Aluminous Shale	810	229	28

SOURCE: U.S. Bureau of Mines Data.

1/ Deposits contain 40% alunite which is 37% alumina

2/ Deposits contain 12% dawsonite which is 35% acid-extractable alumina.

before it would become economically feasible to invest in large-scale production of alumina from domestic clays and other non-bauxite aluminon ores.

The delivered cost of Jamaican bauxite at U.S. Gulf ports was approximately $11.40 per ton in 1973, the latest year for which reliable figures are available, exclusive of royalties and taxes.[28] Since the delivered cost of bauxite from other suppliers remains substantially above that from Jamaica, Kingston would retain its competitive advantage even if imposing further increases in royalty payments for its ore. The competitiveness of Jamaican ore is determined by the differential cost of delivering alumina to smelters on the U.S. mainland. Australian bauxite deposits are extensive, but mining costs are higher than those in Jamaica and other LDCs. The much higher transport costs from Australia to U.S. smelters on the west coast means that Jamaican bauxite shipped to the U.S. and processed into alumina here remains competitive with Australian alumina. If Jamaica expands its domestic capacity to extract alumina from bauxite, it will widen its competitive advantage over higher cost producers and retain its ability to dictate purchase terms to U.S. aluminum companies. Thus, further increases in taxes and royalties are possible, indeed probable, before IBA members seriously jeopardize their de facto monopoly over the supply of aluminum-bearing ores.

Research into methods of extracting alumina from plentiful domestic sources of aluminous ores has been going on more or less continuously since World War II. At that time, there was great concern that the U.S. might find itself cut off from foreign supplies of bauxite

at the time when domestic reserves were being exhausted and demand was growing rapidly. A number of processes were found to be technically feasible but commercially non-competitive. More recently, the Bureau of Mines began a cooperative effort in 1973 with several private American companies to test ways of processing domestic aluminous materials--clay, anorthosite, alunite, and dawsonite. This program, now in its third year, was originally scheduled to run through 1979, but the actions of IBA members have stimulated both the aluminum industry and the Bureau to expedite their research program.

In addition to the Bureau's program, Alcan and Pechiney announced conclusion of an agreement in December 1974 to pursue jointly the development of a process for extracting alumina from non-bauxite raw materials abundant in Europe. The two companies are constructing a pilot project in southern France with a capacity of 20 metric tons per day. In their announcement, the two companies stated they believe the plant, which will employ an ion-exchange process using sulphuric and hydrochloric acids, has "an excellent chance of competing favourably with the present Bayer process used with bauxite."[29] A spokesman for Pechiney has stated that a 100,000 to 200,000 ton alumina plant could be in operation by 1980, based on non-bauxite clays.[30]

Alcoa is also engaged in research on a process of its own to extract alumina from anorthosite rock. The company has deposits of this rock in Wyoming reportedly containing more alumina than all of the known bauxite reserves in the world.[31]

Whether any of these research and development efforts will lead to a fundamental breakthrough in aluminum production remains to be seen.

A key problem so far is the fact that all of the processes being examined as a substitute for extracting alumina from bauxite are even more energy intensive than the Bayer process. In an era of rising energy costs and dwindling supplies, this factor serves as a severe constraint on the enthusiasm of companies to invest heavily in speculative new processes. Nevertheless, the practical effect of these research efforts is potentially to diminish the degree of dependence of the U.S. and other industrialized countries upon the members of the IBA for essential supplies of bauxite and alumina.

In the U.S., primary production of aluminum was begun in 1888 by the Pittsburgh Reduction Company, the progenitor of Alcoa. By 1893, when data on aluminum production were first collected, the company produced about 100 tons of aluminum metal. Until 1940, there was only the one firm producing primary aluminum in the U.S. With the advent of World War II, the government moved energetically to expand greatly the U.S. aluminum production capacity, and subsequently both Kaiser and Reynolds were permitted to buy these new installations at considerably less than cost.

The industry's growth has reflected the cyclical trends of the U.S. economy. Production increased rapidly during the roaring 20's, reaching a peak of about 115,000 tons in 1929-1930. By 1934, output had fallen to less than one-third of what it had been five years earlier. It picked up toward the end of the decade and surged rapidly ahead during the early 1940s to meet the extraordinary requirements of World War II. In 1943, production of primary aluminum in the U.S.

exceeded 900,000 tons, a level that would not be equalled until a decade later when production passed the one million ton mark for the first time. Since then production has been growing at an average annual rate of 6.8 percent, reaching an all-time high of 4.9 million tons in 1974.[32]

Typical of the cyclical trends which have been characteristic of the aluminum industry, production fell nearly 22 percent to 3.8 million tons in 1975 reflecting the depth of the recession. According to industry quarterly reports, production of primary aluminum has remained roughly 25 percent below capacity even though there has been some increase in demand for aluminum products accompanying the recovery in late 1975 and early 1976. Two of the areas of the U.S. economy most severely affected by the recession are the largest consumers of aluminum mill products--building and construction (21%) and transportation (19%). Other major consumers are electrical (14%), containers and packaging (18%), and consumer durables (9%).

Although the U.S. accounts for about one-third of the world primary aluminum production, in most of the past ten years 10-15 percent of U.S. consumption consisted of imports of ingot and mill products, mostly from Canada. In 1973 and 1974, sales of aluminum metal from surplus U.S. Government holdings satisfied about 11 and eight percent respectively of the demand for aluminum, thereby substantially reducing the need for imports. Virtually all of the primary aluminum in government stocks has now been sold, and if demand should pick up along with the economic recovery and domestic capacity is not expanded in the next few

years, the U.S. could become dependent on imported aluminum for an increasing percentage of its requirements. The Bureau of Mines estimates that the U.S. demand for primary aluminum through 1980 will grow at an annual rate of about six percent, using 1974 as the base year. As of mid-1974, domestic aluminum companies, then operating at close to 99 percent capacity, had announced plans to increase smelting capacity by 101,700 tons per year in 1975, 185,000 tons per year in 1976, and 307,000 tons per year in 1977.[33] The recession and sharply reduced demand for aluminum products has caused the companies to postpone most of these plans

The Bureau of Mines, using cost data gathered in 1974, estimated the total capital cost of increasing primary aluminum capacity to be about $2,600 per short ton of aluminum metal. This cost is distributed roughly as follows: $200 for bauxite;* $800 for alumina; and $1,600 for primary aluminum, including $600 construction cost for providing power to the smelter (all figures are per ton of aluminum metal.) Thus, if the preliminary forecast made in 1974 of growth in aluminum shipments to more than 10 million tons by 1980 prove to be accurate, the investment required would be in the vicinity of $7.5-8.0 billion. This figure may well turn out to be excessive since the depth and length of the recession has significantly exceeded projections made two years ago. Furthermore, the greater emphasis placed on energy conservation will encourage increased

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*This figure for investment in new bauxite production capacity does not include exogenous factors such as the cost of roads, ports, and other infrastructure that might be required to develop deposits in inaccessible areas, such as much of the Amazon basin.

use of recycled aluminum.

U.S. industry's inventory of scrap, ingot, metal in process, and finished mill products increased in both 1974 and 1975. At the beginning of 1976, the Bureau of Mines estimated total industry stocks at about three million tons. Reynolds and Alcoa annual reports for 1975, however, indicate that these firms have been drawing down on their stocks somewhat to meet the increased demand during the first two months of 1976 while waiting to assess the strength of the economic recovery before increasing production. Eventually, depletion of industry stocks and the exhaustion of the GSA aluminum stockpile will be reflected in an inability to accommodate increased demand without new investment or larger imports.

Secondary production of aluminum has increased steadily in recent years. In 1974, secondary recovery amounted to 1,251,000 tons, an amount that represented 20 percent of the total U.S. consumption and equalled about 25 percent of the primary production that year. About 25 percent of the secondary recovery, some 304,000 tons, were recovered from old scrap, mostly from some 2.3 billion all-aluminum cans collected and turned into recycling centers by consumers. The remainder was recovered from new scrap generated by plants making end products.[34] One important reason for the heightened interest in the scrap recovery program is the fact that aluminum metal can be produced from scrap for only five percent of the energy required to produce aluminum from bauxite. At a convention of the National Association of Recycling Industries in April 1975, a spokesman for Reynolds called for a 1977 target of 500,000

tons of aluminum from recycled old scrap.[35]

With respect to the location of new production facilities, the trend in recent years has been for large increases in alumina output to be in the major bauxite producing countries. Of the seven major alumina plants constructed during the years 1967 to 1970, five were located relatively near bauxite mines.[36] According to a 1974 OECD Industry Committee study, the average annual increase in alumina production between 1966 and 1972 was 45 percent in Australia, 17 percent in Jamaica, 23 percent in Surinam, 20 percent in Brazil and 12 percent in Guyana. During the same period, U.S. imports of bauxite grew at an annual rate of less than one percent while imports of alumina increased at a rate of 32 percent annually. The positions adopted by the members of the IBA support strongly continuation of this trend.

Another factor favoring the location of alumina plants near bauxite mines is the fact that the process used must be geared to the specific types of ores from a particular area. Finally, since the cost of transporting a ton of alumina is about the same as the cost of transporting a ton of bauxite, it is almost always more efficient to ship alumina to the smelter.

Smelters have historically been located near a source of inexpensive electric power since the Hall-Heroult process requires 14,000-16,000 kwh of electricity to produce one ton of primary aluminum. For example, during the rapid buildup of capacity in the early years of World War II, Alcoa and the newcomers to the field, Reynolds and Kaiser, built smelters in the region served by the Tennessee Valley Authority.

Subsequencly, facilities were located at Messena, New York where the St. Lawrence Project of the New York State Power Authority had cheap hydroelectric power available. Following completion of the Bonneville Dam in the State of Washington, the major producers opened smelting facilities in that area. Availability of hydroelectric power moved Kaiser and Alcan to enter into a joint venture to construct an aluminum smelter in Ghana near the Volta River Dam. This facility was designed to process ores shipped from the Caribbean. There are no large undeveloped sources of hydroelectric power remaining in the U.S., and the problem of locating new facilities in the future will be a difficult one.

There are significant economies of scale in the optimal size of an aluminum reduction plant in the U.S. Costs mount sharply if the plant size is reduced significantly below 100,000 tons per year. The cost of producing primary aluminum was about $725 per ton, exclusive of royalties and taxes, in 1974.[37] Of this cost, over 20 percent was the cost of electricity. In 1975, taxes and royalties amounted to an average of $13.00 per ton of bauxite. Since approximately four tons of Jamaican bauxite are required to produce one ton of aluminum, the total cost of primary aluminum came to about $780. Increasing energy and labor costs are pushing this figure up inexorably.

There have been schemes advanced by various Caribbean states to develop an indigenous aluminum smelting capacity. The only country that now processes any of its bauxite into primary aluminum ingot is Surinam. These proposals have not, however, led to any concrete results.

A major inhibiting factor is the high cost of energy in the Caribbean area, except in Venezuela and Mexico, but neither of these countries are major producers of bauxite and neither is a member of the IBA.

With the disappearance of relatively cheap sources of electric power in the U.S., aluminum companies began the search for alternatives. Plans were announced to build six large aluminum smelters in the Middle East to take advantage of cheap and plentiful natural gas as an energy source. The persian Gulf states flare approximately 9.6 billion cubic feet of associated natural gas daily, a quantity representing nearly 25 percent of the total U.S. consumption. Saudi Arabia alone flares about 4.0 billion cubic feet per day, roughly 15 times the consumption of the greater Washington metropolitan area. The Saudi Arabian Monetary Agency has allocated more than $4.5 billion in its current five-year development plan to construct a gas-gathering system. Several large U.S. firms are already working with the Saudis in preparing plans for future industrial projects using the country's natural gas resources, either as energy or as feedstock for petrochemical plants. It remains to be seen whether the announced plans of the U.S. aluminum industry to expand on the basis of Middle East energy resources will materialize.

Finally, it is often suggested that substitute materials could be used in lieu of aluminum if U.S. industry were to face serious supply constraints as a result of collusive actions by IBA members. There are a number of possibilities. Steel, stainless steel, magnesium, and zinc can be substituted for many of aluminum's uses in the automobile industry. Stainless steel, magnesium and titanium are potential substitutes for

aluminum in aircraft. But in the important area of transportation, where a high payload to weight ratio is important, most observers believe aluminum is relatively immune to competition from these potential substitutes. Aluminum has displaced copper from many parts of the electrical market and presumably the process could be reversed, at least to some extent, as long as copper remains relatively abundant. Wood, of course, remains a major competitor for aluminum in the construction industry and could easily substitute for many uses in a period of short supply. In recent years, plastics have been used to a growing extent in consumer products that had been growing markets for aluminum. This trend may be reversed as the production cost of plastics rises to reflect the large increase in price for petroleum-based feedstock and energy. At least one industry observer has also challanged the aluminum industry's assumption that the demand for lighter weight automobiles will be an important source of new demand for aluminum. He opines that fiberglass reinforced plastics will replace some of the uses to which aluminum is already being put.

CHAPTER VII

SUMMARY AND CONCLUSIONS

In the foregoing chapters, this study has analyzed how Third World disappointment over the meager achievements of two decades of economic "developmentalism" has led to a mounting sense of injustice and exploitation. One result of this feeling has been the emergence of a new cohesiveness and common sense of purpose among the poorer nations of the world. Increasingly frustrated over the growing gap in the standard of living between the industrialized nations and many of the LDCs, the latter have coalesced in demands for a program for a new international economic order that would, inter alia, alter their terms of trade and bring about an accelerated transfer of technology from the industrialized countries. Illustrative of this situation was the Lome Convention between a group of 46 LDCs and the European Community, which became operative in January of 1976, which established a plan for stabilizing the export earnings of developing nations from certain commodities. This was the first formal multinational arrangement whereunder rich nations undertake to guarantee the earnings of poor states, and it could serve as a model for LDC proposals at UNCTAD IV in Nairobi in May 1976.

The success achieved by OPEC nations in late 1973 and early 1974 in nearly quadrupling the price of crude oil, despite very low

production costs and an abundant supply capacity, became an alluring example for producers of other primary commodities to emulate. There are, however, certain unique characteristics of the international petroleum industry which have enabled OPEC to succeed thus far but which producers of other commodities do not enjoy. The two most important of these are that there are no alternatives to OPEC supplies to satisfy the highly inelastic short-term demand for petroleum, and Saudi Arabia alone can determine the quantity of crude oil that will be available to importing countries at virtually no economic cost to the regime.

Conventional economic theory of cartel formation is inadequate to analyze the circumstances surrounding current producer cartel formation in primary commodities. Most of the literature draws heavily on the activities of industrial cartels in western Europe between World Wars I and II or on past efforts to form international commodity agreements between producers of primary commodities and industrial consumers designed to reduce wide price fluctuations resulting from cyclical production patterns. Such analyses have neither considered the implications of the increasing politization of the international economic scene nor the mounting perception of growing shortages of non-renewable resources. Past experience shows clearly, however, that tight control over supply and unanimous agreement among members on production cutbacks for economic as well as political purposes, are essential for an effective cartel.

The International Bauxite Association was established in March 1974. The ten members of the IBA account for about 65 percent of

world bauxite production and over 80 percent of world trade in bauxite. The U.S. imports 90 percent of its bauxite requirements from IBA members. The declared objectives of the IBA include securing "effective national control" over bauxite production and working for a common pricing formula. Jamaica, one of the founding members of the IBA and the largest exporter of bauxite to the U.S., unilaterally increased taxes and royalties on its ore in 1974 and most of the other members have followed suit.

Although there are vast deposits of various aluminous ores in the U.S., at present none are competitive with bauxite as a raw material for the production of aluminum metal. Furthermore, the industry is highly concentrated and vertically integrated with six multinational corporations, three of them U.S.-based, producing more than 50 percent of the world's primary aluminum. In addition, the reduction of alumina to produce aluminum metal is a highly energy intensive process, and production facilities historically have been concentrated in the industrialized countries near sources of abundant, cheap energy. Before the recent recession, U.S. industry, operating at close to 100 percent capacity, produced almost all of its aluminum domestically, using primarily bauxite ores and alumina imported from IBA members. Jamaica is the lowest cost source of bauxite for the U.S. market, even after the substantial increase in tax and royalty payments imposed in 1974 are factored into the price. Under current plans Kingston is hoping to increase production of alumina in that country, and if plans succeed, it will retain its competitive advantage in the U.S. market for some time to come.

In an effort to develop an alternative domestic supply, the search for an economically-feasible process to extract alumina from

domestic aluminous deposits in the U.S. is continuing. To date, however, no process has been developed which comes close to being competitive with either Caribbean bauxite or Australian alumina. Thus, even if IBA countries impose further price increases, U.S. producers, for economic reasons, will continue to import the major share of bauxite requirements and alumina from cartel members. Only if the IBA were to impose a rigorous embargo on the sale of bauxite or alumina to the U.S. or increase prices to a level that made alternative materials competitive would any major change in the structure of the U.S. aluminum industry be likely. Based on the foregoing analysis, neither course appears even remotely possible at the present time.

Thus, it seems eminently reasonable to conclude that the U.S. economy is not likely to experience serious collusive pressures from the IBA; nor, in the longer term, is it vulnerable to actions by IBA members comparable to those taken by Arab members of OPEC in October 1973. First of all, the aluminum is not nearly as important as oil for the U.S. industry. Primary aluminum manufacturing represents a little less than one percent of U.S. GNP whereas petroleum refining and related industries contribute between four and five percent to the GNP.[38] Moreover, the two essential ingredients for successful cartel action by the IBA are missing: There is no disciplined unanimity of purpose among the membership, and there is a lack of tight control over supply required for measures restricting production to be effective. Specifically, Australia, currently the largest producer of bauxite,

possesses very substantial reserves and has the capacity to continue to expand production for many years. Statements by Australian officials, make it clear that Canberra does not share the perceptions of injustice and exploitation that have dominated the thinking of many of the non-aligned members of the Association. Consequently, the latter can have no serious illusions as to the prospects for Australia cooperating with any collusive cartel actions they might wish to take against the U.S. and other industrialized countries.

With respect to supply, although IBA members now dominate the international trade in bauxite and supply the U.S. with 90 percent of its needs, non-member producers are rapidly increasing their capacity. Brazil and the Cameroons, to name just two, have considerable reserves and potential for expanding bauxite production. So far neither has shown any particular desire to join the IBA, although the day may well come when these nations will perceive a net advantage for so doing. In sum, there appears to be sufficient elasticity of bauxite supply outside the IBA to place in real doubt the Association's ability to take restrictive actions without risk of moves by outsiders that would effectively undermine IBA decisions with respect to pricing and production.

But the fact that the U.S. economy is not nearly as vulnerable to disruption from IBA activity as it is to moves by OPEC states does not mean that it can simply ignore the demands of IBA countries. In the short term, perhaps for as long as a year and a half or two years, commercial stocks of primary aluminum, together with increased recycling

of scrap and greater use of substitutes could fulfill essential U.S. aluminum requirements. Areas of the economy which are steadily increasing their use of aluminum--construction and transportation--would feel the pinch of reduced supply and possible dislocations in production, however. In particular, the trend toward lighter and more efficient automobiles would be set back by a shortage of aluminum with concomitant environmental impacts. Furthermore, the U.S. dependence on imports has made the price of aluminum sensitive to price changes and interruptions of supply. Despite the U.S. economic recession of 1974-75, which had a severe impact on the aluminum industry, the price of primary metal has nearly doubled, reaching a level of 44 cents a pound at the end of April 1976. This continued upward trend in aluminun prices is in part due to the increased taxes imposed by IBA members and in part the result of substantially higher energy costs. But the higher price for aluminum ingot will, in turn, trigger a further increase in taxes on bauxite under the IBA formula of basing taxes on the realized prices for aluminum metal.

With respect to the long-term strategic interests of the U.S., it is true that, if faced with serious supply problems, the U.S. could turn to construction of facilities for processing non-bauxite, aluminous ores. Existing technology would not, however, make such facilities competitive, partly because all alternative processes are highly energy intensive. Thus, the need for abundant energy, as well as the availability of raw materials, will continue to be a major factor influencing the directions for future developments within the aluminum industry.

Despite the serious political factors that must be carefully considered, the possibility of locating future aluminum smelters in the Middle East to take advantage of the natural gas that is now being flared cannot be ruled out. Should U.S. industry proceed in this manner, U.S. economic interests in the Arab world would be expanded.

Obviously, the aluminum industry has unique characteristics which suggest caution before suggesting that the IBA will be the pattern for future schemes to establish producer cartels in other primary commodities. But there are aspects of the establishment and evolution of the IBA thus far which may serve to amplify the OPEC model and make the idea of producer cartel formation an attractive course for LDCs to pursue in their quest for more economic prosperity. The successes achieved by the IBA countries in their confrontation with multinational aluminum corporations can only reenforce the belief, widely held among the "Group of 77", that the industrialized nations are becoming increasingly dependent on their primary commodity resources. It seems safe to predict that their demands for new and more favorable terms of trade and other economic arrangements will become more insistent in the months and years ahead.

It is clearly evident that the U.S., as well as other industrialized countries have recognized the reality of "interdependence". The U.S. has come to accept the principle of a generalized system of tariff preferences for exports from LDCs. The Ford administration has declared its intention to expand its program of multilateral trade negotiations to make it easier for LDCs to sell processed and semi-processed goods in the U.S. market. The U.S. has joined the Fifth

International Tin Agreement aimed at stabilizing prices for that metal, and apparently it intends to become a member of the International Coffee Agreement. U.S. representatives are now participating actively in the current round of CIEP talks in Paris exploring ways of devising an integrated program for resolving some of the more difficult problems currently affecting the international economy.

Despite the strident demands of the LDCs for more economic "justice", there appear to be opportunities for working out mutually beneficial economic policy and structural arrangements between the U.S. and producers of primary commodities. The latter want guaranteed returns for their resources, freer access to U.S. markets, and restraints on the operations of U.S.-based multinational companies. For its part, the U.S. wants--indeed requires--guaranteed supplies of critical primary commodities to maintain a satisfactory rate of growth in its industrial production. These considerations were unquestionably very much in Secretary Kissinger's mind when he introduced his proposal for a new international development bank for resources at the UNCTAD IV conference in May 1976.[39] Whether this proposal goes far enough to satisfy the more militant LDCs remains to be seen. But it does suggest one way to expand cooperation between commodity producers and industrialized countries. Since the U.S. economy is both the most advanced and largest of the world's modern economies, it has the most to gain from such cooperation and, potentially, the most to lose if efforts to avoid confrontation fail.

While the U.S. economy is not vulnerable in the usual sense to the IBA, our economic strength in every sector is not sufficient to pursue

a neo-isolationist policy and thereby ignore specific dependencies on foreign sources of supply for primary materials. The fact remains that the U.S. is still the unrivaled economic power in the world, in a macro-economic sense. But its power to control events in the international arena is being eroded by new realities which circumscribe effective power in contemporary terms. The traditional view that military supremacy ultimately determines the outcome of world affairs is no longer completely valid in a world dominated by growing economic interdependency and ideological motivations. The development of nuclear weapons has irreversibly weakened the correlation between power, as measured in terms of military strength, and power in the sense of ability to exercise control over events. Vietnam and the Arab-Israeli conflict stand as two eloquent examples of new evolving international relationships. Thus, a much higher priority must be assigned to efforts to develop new and more fruitful relationships with Third World countries for the future, not on a basis of aggregate economic power of each partner but one which recognizes relative criticality and dependency. The days when offers of grant development assistance on terms largely dictated by the U.S. could serve as the cornerstone of economic policy toward developing nations are over. In the future, these relationships must be more cooperatively derived and reflect more clearly the growing interdependencies between the industrialized nations and developing countries. A viable economic strategy, therefore, must strive to harmonize the divergent interests of commodity suppliers with those of industrial consumers into a complimentary relationship beneficial to both groups of nations.

FOOTNOTES

1. Communique issued in Conakry, Republic of Guinea, March 8, 1974.
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8. Ibid.
9. Ibid.
10. Plenary Meeting of the Sixth Special Session of the U.N. General Assembly, April 9, 1974.
11. U.N. General Assembly, April 10, 1974, A/PV 2208.
12. U.N. General Assembly Resolution 3201 (S-VI) and 3202 (S-VI), May 9, 1974.
13. The New York Times, March 1, 1975.
14. U.N. General Assembly Resolution 3281 (XXIX).
15. A/10112, Chap. IV, March 1975.
16. Resolution 3362 (S-VII), September 16, 1975.
17. C. Fred Bergsten, "The Response to the Third World" in Foreign Policy, Number 17, Winter 1974-75.

18. Much of the historical data on OPEC is from 'Abd al-Amir Q. Kubbah, OPEC -- Past and Present (Vienna, Austria: The Petro-Economic Research Center, 1974).

19. Abu Dhabi became a member in 1967, Algeria in 1969, Nigeria in 1971, Ecuador in 1973, and Gabon became an associate member in 1973.

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